v. 15 #9

The MONTHLY REVIEW

Published Monthly by the

American Electroplaters Society

A SOCIETY FOR THE ADVANCEMENT

OF THE

SCIENCE OF ELECTROPLATING

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MONTHLY REVIEW

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American Electroplaters Society

Publication and Editorial Office

3040 Diversey Ave., Chicago

VOL. XV SEPTEMBER, 1928 No. 8

EDITORIAL

It is often as hard to keep money safely as it is to get it in the first place.

The best rule for an investor is to consult those responsible people who make a business of studying the matter.

All advertisements in every street car and newspaper where advertising is permitted will tell you the above things, and are the result of research by the best purchasers of advertising.

We quote you the above to illustrate just how easy it should be for each member of the A. E. S. to sell an interest in his local branch of this great American society, to some brother plater not yet familiar with our work.

We are specialists in every line of our industry, practical and scientific, have discussions by both the aforesaid specialists, regularly, and are in a position to offer bonafide results to men interested in plating and its kindred subjects.

So, members, it behooves us to do every uninitiated electroplating foreman a favor by selling him a membership and interest in the A. E. S. at this time.

ADDRESS BY PAST PRESIDENT AND EDITOR F. C. MESLE

Toronto, Canada, Annual Meeting

Mr. Chairman, representative of the Mayor, and Fellow-Members of the American Electro-Platers' Society: It certainly is a privilege and pleasure for me to say just a few words on behalf of the members who are assembled here at their sixteenth annual convention, and we certainly appreciate the words of welcome, and the description of the city of Toronto along with its historic setting and many of the important features we are to see while here in this beautiful city. Of course, the description of it and all the wonderful things said about it I presume are all true and I am sure that before we leave we will have plenty of opportunity to investigate some of the many interesting features.

I notice by the description of what had been done over at Sunnyside that at least a few wet spots in Toronto have been dried up; they told us that was all water over there. It certainly is gratifying to be here and realize that the majority of our membership here are citizens of another country. It certainly is gratifying also to realize that that fact is no barrier to our being here and to a feeling of good will and brotherhood. As has been suggested, we have lived as neighbors at peace for over 100 years. We have not found it necessary to erect forts or other instruments of defense, but instead of that we have been erecting peace bridges which are intended to unite the countries even closer together. (Applause.)

It has been said that these two countries, I do believe, represent, well, the best that there is, and I am sure that the example of peace and of good will is going to be a factor and an influence in the entire world. I hope that there never will come a time when we will find it necessary to erect fortifications on our borders. I hope rather that we shall build more peace bridges (applause) and if possible, some day, do away with the objectionable immigration officers that do still patrol the borders.

Now, we have gathered here in the interest of our science, shall we call it, that of electro deposition of metals, and when we realize that this science enters into nearly every type of modern life, whether we are thinking about safety pins or vanity cases the ladies carry or the chandeliers or anything that enters into modern life, we find the science of electro-plating is playing an important part. And here in Toronto we have quite a number of establish-

ments that are doing big things along the line of electro deposition of metals.

I am sure that any observer who will notice our conduct while here and the attention we give to business will realize that the first purpose of our being here is to increase our knowledge and our skill and information along the line of our work.

Now, of course, we are also here to play, to have some recreation, and I am sure that the provisions that have been outlined on the program are going to be appreciated by all and that we are going to have a very enjoyable time.

Of course, Toronto was chosen as the convention city, I judge, for a great many reasons. Some are here simply because Toronto happens to be in Canada. That is there are some features about Canada that do differ just a little bit from our own country, but I think, however, most of us are going to so enjoy that recreational feature that we are going to retain a clear eye so we can behold some of the beauties of the city and retain an undimmed mind so that we may enjoy the educational features of this convention.

So I thank you, Mr. Mayor, for your kind words of welcome, and I am sure that we are going to appreciate the time we spend here in your city.

ADDRESS BY MR. CHARLES H. PROCTOR

Mr. Chairman, ladies and gentlemen, guests of Toronto, Canada, Branch, and 16th annual convention of the American Electro-Platers' Society:

It gives me great pleasure today as the founder of the Society to address you upon a timely subject, "United We Stand, Divided We Fall."

I voice the sentiment of every member of the society and every guest of the society when I tell you we are all glad to come to your beautiful city of Toronto, the city of opportunity you so aptly term it. We feel confident that a great hospitality awaits us, not only from our beloved members of Toronto Branch and the entire membership of our society in Canada, but also from a great people who have the same ideals as our own people in America.

Although there is a great imaginary line that extends from the Atlantic to the Pacific Ocean that divides us as great peoples, yet to all intents and purposes we are all Americans as well as Canadians. It is our earnest hope that through the coming years, through to the end of time, until the millennium shall come, we

shall continue to exist as two great peoples with the same ideals, with the same basic principles of universal liberty, that that great imaginary line shall continue through the aeons of time because as great peoples we must always be united in ideals, otherwise liberty and the pursuit of happiness will eventually fall, so "United We Stand, Divided We Fall."

This is the second time in the history of our society that we have come to Canada to celebrate our annual convention; the first in Montreal. And what a splendid convention that was. The memory still lingers. There were visions of a second visit to your beloved country and so we have come again and from memory's pages we turn to Toronto to help you celebrate this 16th annual convention, to enjoy the splendid hospitality to make this another great convention in your country and we feel sure we have not come in vain.

As each annual convention marks another milestone in our history so let this milestone be adorned with this inscription, the greatest convention of all, for all the membership, for its votaries wherever they may reside; let the great work to be accomplished during the 16th annual convention be for the good of all its membership, for the great industry we have the honor to represent, for the good and welfare of commercial industry in Canada and the United States.

We are mindful of the fact that we have come to Canada to your beautiful city to work and to play, to enjoy our leisure moments to the very utmost, but let us also remember that we are Americans, that we are guests of Canada and may everyone feel that responsibility when they are enjoying the blessings of Canada which to the great misfortune of many, many millions of citizens of the United States is denied to them, not by honest representative of all the people, but by political tricksters, by shysters, by make-believe lovers of their country, that through the bigotry of their own personal ideas would destroy the liberty and pursuit of happiness, that their constitution entitles them to, but is denied them because of an amendment to their constitution made in the hours and trials and tribulations in the throes of a great world war. They sacrifice a great human liberty that does of right belong to them in the time of peace.

I know there are millions of Americans that wish they could move Canada into the United States and the United States into Canada because then personal liberty would be equalized and peace

and contentment would be in the hearts and minds of millions of our countrymen as well as yours.

We are mindful of that fact that the great and immortal Lincoln in his Gettysburg oration, speaking of the honored dead that gave up their lives that a great nation might endure and that government of the people, by the people and for the pepole shall not perish from the earth, intended personal liberty for all. May that great liberty return to America so that its millions may enjoy the liberty God hath given them and take away from them the taint that in the eyes of the law and the constitution of the United States they are criminals because they believe their constitution does guarantee to them liberty and the pursuit of happiness and with respect and hope for the future they are Americans, not because they love their country less, but liberty more.

In our own society there are men who are helping to destroy the personal liberty of the individual plater, who are posing as chemical experts and are reaping large rewards to the detriment of the society and its membership. They know nothing as a rule of commercialism from the productive standpoint. Many of them would not be able to hold a position as a productive, intelligent plater, with a thorough knowledge of the art if they were placed in such a position. Yet they connive to gradually get into plants, because they make believe that with only a knowledge superior in their minds of being able to analyze the respective firm's solutions once or twice a week, from which they reap rich rewards in proportion to the value received.

The plater must still do all the work, still be responsible for production. Is it not time that every member of our society who holds the position as foreman, plater or supervisor should become his own chemist, should depend upon his own superior knowledge to perform his own analyses of his solutions, thereby be absolutely independent of any outside source that eventually must be a detriment to him?

I am mindful of the fact that many of our members have made a study of chemical analysis of solution, so have become super platers and require no assistance from any outside source, which must prove a detriment to many platers and must eventually degrade their profession.

It is with a source of great satisfaction that many institutes of learning not only in Canada but in the United States have taken a great interest in the activities of our society and membership and

doctors and professors connected with the several universities have given much valuable time to the betterment of the knowledge of the electro-plater without any intrinsic reward but from the basic principle of good fellowship and the spirit of fraternal brotherhood. These are the type of men we want, we admire; Dr. W. Blum, Bureau of Standards, Washington; Professor Oliver P. Watts, University of Wisconsin; Dr. Hiram Lukins, University of Pennsylvania; Dr. Strachanan, Brown University Providence, R. I. We need more of the Blum, Watts, Lukins and Strachanan type who are willing to meet us as platers on the level, to join in our activities and receive the reward of appreciation that is not told in dollars and cents but in co-operation and esteem. You have men such as Blum, Watts, Lukins and Strachanan of Providence, R. I., in Canada, all hail to them; we glory in their value to you as Canadians and we as Americans.

Some day (I don't know when, but according to our own constitution of the American Electro-Platers' Society) we shall have our own research laboratories, shall do the work of the Society as the constitution guaranteed we should do. You shall then send all your perplexing problems to the Society's laboratory. You shall then solve the problem of everlasting "spotting out"; you shall then force the manufacturer of metals and alloys used in the metal fabricating industry to give you a perfect metal with a perfect crystalline structure so that you shall not have any spotted out products.

You shall not have any peeling of your nickel plated products; you shall not have any hydrogen pits; your plated products shall be uniform and of a standard quality that shall pass any inspection that shall meet any specification that may present itself. You shall deposit chromium as you please without detriment to yourself or to your employer, irrespective of the hundred patents that give identical results with "Sargent's Solution" that is not patented.

Then you shall be united, you shall not fall, and so as I close this brief address I want to extend to every member of the Society my congratulations for the splendid work they have accomplished in building up this splendid structure of the American Platers Society from the foundation that I had the honor and glory of laying not yet two decades ago.

Its future is in your hands; you alone must guarantee the continuation of the building up of a superior knowledge of the Society

and its fundamental principles of cooperation for one and all of its membership.

As the years go on and on I shall be always with you, "fighting the way through on basic principles" always with the realization that what has been accomplished is all for one and one for all and for the glory of a great united American Society of American Electro-Platers.

Report by Dr. Wm. Blum (U. S. Bureau of Standards, Washington, D. C.): "Progress Report, Research on Electrodeposition, July 1, 1927, to June 30, 1928, at Toronto, Canada Annual Meeting."

"I. *Personnel.* During this fiscal year three members of the section resigned to accept commercial positions, viz.: H. E. Haring, J. H. Winkler, and R. A. Dimon. This caused considerable interruption of the research work as it was necessary to engage and instruct other persons, most of whom had little actual experience with research in this field. One encouraging feature of these changes in personnel, however, is the evidence of an increasing demand from industry for persons qualified to conduct and apply researches on electrodeposition.

"The present members of this section and their principal duties are as follows:

"William Blum, Section Chief; M. R. Thompson, Assistant Section Chief, Cyanides; H. R. Moore, Principles of Chromium Plating; N. Bekkedahl, Cyanides and Miscellaneous Analysis; G. E. Renfro, Properties of Chromium; A. B. J. Clark, Miscellaneous Plating; W. P. Barrows, Research Associate of American Electro-Platers' Society, Spotting Out; H. L. Farber, Research Associate of American Electro-Platers' Society, process of chromium plating; R. O. Hull, Research Associate of International Association of Electrotypers, addition agents in acid copper solutions.

"Owing partly to the changes in personnel, no large investigations were completed during this year. The progress and status of each of the projects may be briefly summarized as follows:

"II. *Researches.* 1. Chromium Plating. The widespread interest in chromium plating is indicated by the receipt of about 100 inquiries per month on this subject in addition to the requests for Technologic Paper 346, of which over 3500 copies have been sold by the superintendent of documents since it appeared in June,

1927. In addition, over 100 persons visited the Bureau during the year to obtain information on chromium plating. About fifteen addresses on this subject were given to local sections of various technical societies, by whom the traveling expenses were paid. Incidental to these trips a number of plants engaged in chromium plating were visited. Through all these contacts and through the literature on this subject we have endeavored to keep in touch with the progress of chromium plating and to determine which phases of it are in need of further study. Our present program for studies on chromium plating includes the following subject:

"(a) *Principles.* Experiments are in progress upon the conductivity and other properties of chromic acid bath, in order to determine their constitution and especially the form and function of the basic chromate.

"(b) *Process.* Measurements are being made of the throwing power during chromium plating under different conditions of operation. Even though it may not be possible to produce a marked improvement in throwing power, it is highly desirable to know what composition, temperature and current density yield the best results.

"Subsequently a study will be made of the favorable conditions for producing chromium deposits with any desired appearance, hardness, and protective value, upon different metals including brass, steel and iron, aluminum, zinc, nickel, tin and various alloys. Progress reports will be issued as each phase of this work is completed.

"(c) *Properties of Chromium.* As chromium owes its value to specific properties, it is desirable to measure these properties exactly and to determine their relation to the conditions of deposition. Specimens have been or will be prepared by this section for the measurement by various divisions of the Bureau of such properties as hardness, wear resistance, coefficient of expansion, specific gravity, color, reflecting power, melting point, conductivity, tensile strength, surface tension (wetting by water and by oils) resistance to oxidation and chemical action, porosity and protective value. The preparation of suitable specimens may require much time and ingenuity.

"(d) *Cooperation with Other Government Departments.* Chromium plated printing plates have continued to yield good results at the Bureau of Engraving and Printing and seventy-five

per cent of the paper currency and postage stamps are now being printed from these plates. The baths have required no attention except the routine analyses for maintaining their composition.

"At the U. S. Mint in Philadelphia a small chromium plating unit was installed. Chromium is giving satisfactory results on steel collars, plaques used for producing the steel dies, and various parts of the mechanical equipment. The results on the coinage dies are promising, but not yet conclusive.

"We have prepared chromium plated specimens for use in a study now in progress at the U. S. Bureau of Chemistry and Soils upon the suitability of chromium for food containers and cooking utensils.

"Having received numerous inquiries upon the health hazards in chromium plating, we have arranged to cooperate with the U. S. Public Health Service in at least a preliminary survey of the ventilating conditions in chromium plating plants, and the possibility of injury to the health of the operators.

"We are cooperating with the federal specifications board in the preparation of a specification for chromium plating on plumbing fixtures. Information and samples have been obtained from numerous manufacturers to furnish a basis for this specification. Numerous other government departments have requested information on chromium plating or have submitted articles to be plated for their use.

"2. *Spotting Out.* Most of the year was spent in a study of the crystal spotting which occurs only on lacquered sulfide ('oxidized') finishes. The results have been published and distributed to the subscribers to the Research Fund. They indicate the possibility of greatly reducing this difficulty by excluding sulfur or sulfur compounds from access to the finish. This may be done most effectively by wrapping the articles in wax paper or by applying a very thin film of grease to the surface.

"The results so far obtained on the stain spotting will be separately reported by Mr. W. P. Barrows to this convention.

"3. *Cyanides.* A large proportion of plating solutions contain cyanides, and as they are much less stable than the neutral or acid baths they require more frequent attention and adjustment. Before making a detailed study of the important cyanide plating solutions, it was necessary to obtain reliable information upon the composition and analysis of commercial cyanides. Some very pure sodium and potassium cyanide have been prepared from pure

liquid hydrocyanic acid, and have been used to test the accuracy of the methods of analysis. This information will next be applied to the analysis of plating solutions; including the determination of 'free cyanide.'

"4. *Iron Deposition.* During the year the Bureau of Engraving and Printing has made further experiments upon the deposition of thick iron plates to which reference was made in last year's report. While promising results have been obtained the process is not yet in regular operation. The results at least show that it is possible to produce relatively smooth iron plates (¼" thick) from a bath containing ferrous chloride and calcium chloride, at a temperature of 90° C. (194° F.) and a current density of about fifty amp./sq. ft. The details of operation will be published as soon as the process is thoroughly worked out.

"5. *Copper Electrotyping Solutions.* In electrotyping, the copper deposits or 'shells' are about 0.006" thick. At a current density of about 60 amp./sq. ft. such as is commonly used in agitated electrotyping baths, it requires about two hours to produce such a shell. It would be desirable in many cases, especially for rush orders, to greatly reduce this time of deposition. Organic addition agents are frequently used in such solutions to produce smoother deposits, and to reduce the treeing that is likely to occur at high current densities. A study is being made of the maximum current densities that can be used with and without addition agents; and of methods of determining and controlling such agents as may prove advantageous.

"III. *Future Plans.* The researches outlined above will probably consume most of the next year. At or before the next convention we hope to report definite results on a number of these projects. In the meantime we will confer and correspond frequently with the members of your Research Committee and other members of your Society who are interested in these problems.

"That platers and manufacturers are interested in research in this field is indicated by the attendance of over seventy-five persons at the research conference held at the Bureau of Standards on March 2, 1928. The support of the Electro-Platers' Society was still further demonstrated by the decision to engage another Research Associate to work upon chromium plating. We have added to our equipment and facilities to meet the increase in personnel and will make every effort to obtain results in all these researches that will be of value to the electro-plating industry." (Applause.)

Paper by Joseph Triska, New York Branch

Mr. Stockler: Mr. Chairman and Brother Members of the A. E. S. and Guests: In view of the fact that the author of this paper is not here as he figured he might be at the time he wrote it, I will endeavor to read it and, as far as possible, will explain, if any questions are asked relative to the working of the solution which I am not very familiar with.

"Immersion or Dip Gilding on Brass Jewelry and Novelties in a red or 14 Karat Gold Shade.

"In this article I shall endeavor to explain my method for a number of years of obtaining a 14 Karat Gold shade by the Dip Process as I have been doing with success.

"The articles as they come from the jeweler's department to the plating department are generally coated with green scale. The articles are then put into a solution of potash cleaner to remove all grease. Next they are rinsed off well and placed in a pickle composed of six parts of water and one part of sulphuric acid.

"Leave the work in the pickle for about ten minutes then take it out and rinse off well in clean water. Next pass through burning-off dip, consisting of nitric acid, three parts, water, one part. The articles are left in this for about thirty seconds, after which they are taken out and rinsed in clean water and passed through a bright dip composed of two parts nitric acid, three parts of sulphuric acid, three ounces of table salt. Then take out and rinse off well in clean water, pass through ten per cent solution of potassium cyanide. Then rinse the articles in clean water and plate for five to ten second in 'Gold Solution.'

"The 'Gold Solution' is made in the following manner: take ten liters of water (2.6 gallons) in an enamel pot and dissolve caustic potash, KOH, till it reaches 30 Be′ of concentration. It requires about three to five Kg. (6-10 lb.) of caustic potash, KOH, to reach the degre of 30 Be′.

"Then let it boil for one hour. Take ten grams (⅓ oz.) of fine gold and convert to chloride and dissolve in ½ liter of water. This is known as the 'Stock Solution.' From this 'Stock Solution' add little by little to the dissolved caustic solution until the proper shade is obtained. To clear the deposit, add ½ gram or eight grains of potassium cyanide. Never have this solution above thirty Be′ because it will not work.

"Whenever the solution works slowly add gold from the 'Stock Solution.'

"You may also obtain a nice 'English Gold' shade from this solution but your caustic potash solution must be eighteen Be' instead of thirty Be' and you must omit the potassium cyanide, and the work must first be dipped in an immersion silver solution.

"This immersion silver solution is made in the following manner, in ten liters of water (2.6 gal.) dissolve eighty grams or 2⅔ oz. of silver nitrate and 200 grams or seven ounces of potassium cyanide. Let it boil for one hour. This is known as the Silver Stock Solution.

"Whenever you want to use the Silver Solution, take six liters of water and add two liters from the Silver Stock Solution. Heat it to 100° Fahr. and it is ready for use.

"Whenever you wish to get an English shade, dip the article in a silver solution, rinse in clean water, put the article into the English gold solution for five or ten seconds, rinse it off in cold and hot water and dry it with sawdust.

"Having explained in full detail my method of making and monoplating these solutions, if any member gets the benefit of them I shall be fully paid for my efforts.

"I might further add that I don't think I am capable of answering questions in view of the fact that it is different from anything I have used. I am sorry Brother Triska is not here to answer the questions you might ask. Thank you." (Applause.)

FINANCIAL REPORT FOR THE FISCAL YEAR ENDING MAY 31, 1928

Total Receipts

Per capita tax from branches	$2,648.26	
For supplies, from branches	159.92	
From Toledo Convention Committee	300.00	
From sale of Convention Reports to members	81.00	
Interest on bank account	36.08	
Total	$3,225.26	$3,225.26

Total Expenditures

Printing and mailing "Monthly Reviews"	$1,434.83	
Printing supplies for branches	32.00	
Advertising in trade papers	12.00	
Officers' salaries	250.00	
Officers' traveling expenses to convention	140.72	

Research Committee expenses	52.22	
Toledo Convention expenses	513.00	
Editor's office expenses	39.68	
Secretary's office expenses	60.69	
Secretary's bond	2.50	
Gold medal	26.20	
Total	$2,563.84	2,563.84
Total gain for year		$661.42

Recapitulation

Cash on hand, June 1, 1927	$1,761.22
Total receipts for year	3,225.26
Total	$4,986.48
Total expenditures for year	2,563.84
Total cash on hand, June 1, 1928	$2,422.64

$1,425.10 of the above funds are on deposit in the savings account and $997.54 of the above funds are on deposit in the check account with the Tioga Trust Company of Philadelphia, Pa.

Respectfully submitted, June 15, 1928,

Geo. Gehling, Supreme Secy.-Treas.

SECRETARY-TREASURER'S REPORT FOR QUARTER ENDING MAY 31, 1928

(Office Supreme Secretary, Geo. Gehling)

BRANCH	Members, Feb. 29, 1928	Elected	Reinstated	Suspended	Resigned	Died	Loss by Transfer	Gain by Transfer	Total Members May 31, 1928	Receipts from Branches: Per Cent	Supplies	Balance Due Branches
Chicago	219	3	1						223	114.45		
St. Louis	60								60	62.47		
Hartford, C. V.	36	5							41	21.52		
Toronto	62	2							64	65.10		
Boston	11								11	5.77		
Dayton	28								28	14.70		
Waterbury	31								31	16.27		
Detroit	74	1							75	78.22		
Bridgeport	57	1							58	30.45		
Cincinnati	38								38	19.95		19.95
Cleveland	40			1					39	20.47		
Grand Rapids	26	1							27	14.17		
Indianapolis	22	2							24	12.60		
Milwaukee	53								53	55.64		
Montreal	22								22	23.10	.50	

New York	109	2	..	3	2	..	..	1	107	55.65	6.00	.....
Newark	85	4	1	2	..	1	1	..	86	46.20	.....	.....
Philadelphia	108	6	..	..	..	3	..	..	111	57.97	3.00	.....
Providence	45	..	..	5	..	..	..	..	40	24.68	.....	48.30
Pittsburgh	34	..	..	..	..	..	..	..	34	17.85	.....	.....
Rochester	47	15	..	..	..	..	..	..	62	31.50	1.50	.....
Toledo	26	..	..	..	..	..	..	..	26	13.65	.....	.....
Totals	1,233	42	2	11	2	4	1	1	1,260	$802.38	$11.00	$68.25

Cash in Treasurer's hands, Feb. 29, 1928		$2,344.45
Receipts for Quarter:		
From Branches for P. C. T.	$802.38	
From Branches for Supplies	11.00	
Convention proceedings	3.50	
Total	$816.88	$ 816.88
Total receipts		$3,161.33
Expenditures for Quarter	$738.69	$738.69
Printing "Monthly Review"	$391.40	
Editor's salary	150.00	
Editor's office expenses	20.46	
Secretary's salary	100.00	
Secretary's office expenses	21.28	
Printing branch supplies	19.50	
Convention expenses	6.75	
Research Committee expenses	29.30	
Total cash in Treasurer's hands		$2,422.64
Total cash in Treasurer's hands, Feb. 29, 1928		2,344.45
Total net gain for quarter		$78.19

PHILADELPHIA BRANCH

The Philadelphia Branch held its regular monthly meeting September 7, at the University of Pennsylvania, President Geo. Gehling presiding, with a good attendance.

Mr. A. M. Robson was the speaker of the evening and his subject was "Polishing and Buffing Compounds." From his talk Mr. Robson showed that he was well versed in his subject, explaining the efficiency of using high grade polishing compounds. He also stressed the necessity of the work being cleaned before plating.

Banquet committee was appointed to arrange our annual banquet November 24, with W. M. Scott as chairman.

Philip Uhl, Secretary.

A. E. S. PAGE

Assembled Expert Scraps With and Without Significance

Do You Know

A discovery likely to prove of the greatest importance in wireless and X-ray work and, indeed, in electrical engineering generally, has just been made in the production of a new kind of metal which will allow an electric current to pass through it in only one direction.

Metal Preservative Oil—

Designed to be used as a universal solvent and in fact so named, a metal preservative oil has been announced by the Detroit Universal Solvent Company, Detroit, Mich., known as F-267. Besides having an affinity for all colors and all pigments the oil is claimed to produce a non-porous, tight clinging film, highly resistant to rust and corrosion by itself. It is claimed that only 40 to 60 per cent of the pigment required with linseed oil is necessary with this new oil and that at the same time a 20 to 25 per cent greater coverage is obtained.—*Industrial Gas Magazine.*

ONCE OVERS

By J. J. Mundy

Be Slow in Offering Harsh Criticism—

You haven't any sympathy for the one who yields to temptation.

You feel that he is weak and his fall is, therefore, less to be regretted.

If misfortune overtakes a strong and important cog in the business world, you feel sorry, but for the one who is tempted and falls, you have nothing.

You ought to be more charitable.

Haven't there been times in your own life when you came near giving in to the desire you had to do something against your conscience?

What kept you from yielding?

Was it not some instruction or advice you had been given, perhaps the thought of disgrace to your family?

Supposing you had not had the environment you enjoyed, the counsel of wise parents, a family of which you were proud, would you have overcome your desire to overstep the bounds of propriety?

Can you imagine the position of the weak and easily influenced one?

If you cannot, you should not be harsh in your criticism.—*Chicago American.*

PHILADELPHIA

MEETING OF MARCH 2nd, 1928

Meeting was called to order by President Gehling and all the officers reported present, after electing four new members and reading the applications of two others, the meeting was turned over to the guest speaker of the evening, Mr. Chas. Proctor, founder of the society, and after a few remarks by Mr. Proctor, he gave his talk on:

Cadmium and Zinc

Their Commercial Value to the Metal Fabricating Industry

The electrode position of cadmium upon iron and steel as a protection of the metals from atmospheric corrosion is assuming great proportions in the metal fabricating industry.

Prior to America's entry into the World War in 1918, cadmium had not become a factor in the protection of war materials made from iron or steel against atmospheric corrosion and deterioration due to rust, the grim destroyer of all ferrous metals.

Zinc was still the predominating factor, lead and tin and other so-termed rust preventive factors were in reality only factors in the protection of the ferrous metals from oxidation. The World War, however, was the costly destroying medium that helped to teach America that it was time that she began to consider the protection of her ferrous metal products more seriously than before.

When we consider that, according to the investigations made by the Iron and Steel Institute concerning loss from corrosion of iron during the period of 1890 to 1923, a period of 33 years, 40 per cent of the annual world production amounting to 1,966,-000,000 tons, or about 1,700,000,000 tons, was entirely destroyed by corrosion.

When we consider the ever increasing use of steel and iron in the automobile and other industries, in the production of the frame work of all modern buildings of great proportions that require the maximum of strength, of its tremendous import in railroad construction of its rolling stock, of ships and a thousand and one things that are constructed and fabricated from the metal in this age of iron and steel, and consider the tremendous loss by rust, man's destroying enemy, it is time for America, for the world, to consider the tremendous loss and lay plans each day, each month and each year, for its protection against the destroyer. We fail to realize that nature is not replacing beneath the surface

that what we, as benefactors, are receiving. Slowly we are consuming all of the products nature placed therein, the millions of years ago, for the coming of the human race. When they are gone, "what then"? Slowly but surely humanity is building from nature the weapons that will eventually destroy him.

Only above the surface of the earth does evolution replace what we consume to maintain life and sustenance. Cadmium, then, with its mother, zinc, can be utilized just so long as nature furnishes the zinc from which its child, cadmium, is the offspring, for protection of iron and steel from the grim destroyer, rust.

It is not necessary to go into the history of the first utilization of cadmium or the theoretical value of the metal, this has been presented to you on several occasions, the work of numerous authors have been printed in the publications of the American Electro-chemical Society, in the trade papers, in the American Electroplaters Bulletin and other sources of information.

We know that Russel & Woolrich in 1849 patented the process of cadmium plating—the solution they then advocated is almost identical with the composition of our modern every-day cadmium plating solutions plus the several colloidal factors and addition agents that are added to the modern solution. The solution as outlined in the Russell & Woolrich patent in 1849 was essentially a cadmium cyanide solution. The solution we now operate is essentially a cadmium cyanide solution because the cyanide is the factor.

In 1911 the late Emanuel Blassett, a member of New York Branch, American Electroplaters Society, revived interest in cadmium plating in his splendid article entitled, "The Electro-Deposition of Cadmium," published in December of the same year. He, like his predecessors, maintained the use of cadmium anodes was essential. This article then is truly the basis of prior art established by Russell & Woolrich and substantiated by Emanuel Blassett, and no process that exists today can take from American industry the right to plate commercially with a cadmium cyanide solution with a cadmium anode "as the soluble anode" and the factor in maintaining the cadmium solution constant and under control by its use.

It is only seven years next June since the first process patent covering rust-proofing piano wire was issued, then the second was for springs, the third for edged tools, unfortunately the mystery and the secrecy surrounding the process did not accrue to the value of the patents or its exploitation and the same condi-

tions exist today but industry is much wiser now than in 1921—they know that insoluble carbon anodes that were advocated to be used in the process solutions were but a camouflage for a specific purpose and it was only through an attack made upon the process and public discussion and printed publicity that eventually the advocates of the insoluble anode replaced them with soluble anodes of cadmium.

So today we cadmium plate extensively with the anode that was specifically mentioned in the first patent and by Emanuel Blassett in 1911. It is not necessary to mention who bore the attack and fought the way to commercial cadmium plating but you know that the battle was worth fighting for and will save millions of dollars in the future for the manufacturer of fabricated steel products and without paying tributes in royalties and brought forth a fair basis for others to enter into the field of cadmium plating and, therefore, took control out of the hands of those who would have presumed to control the destinies of cadmium.

So cadmium stands today, when every factor is considered, the protector pre-eminently of ferrous metals against rust, the destroyer, in the commercial metal fabricating industry. We must, however, be mindful that zinc is still the predominating factor when we consider cost as the factor. It is not true, and never will be true, that you can deposit cadmium cheaper than you can zinc—the difference in the cost of the two metals are at least seven to one in favor of zinc, and it is not true that you can deposit twice as much cadmium as zinc with the same current densities.

The atomic weight of cadmium is 112.40 that of zinc 65.37—the density of cadmium 8.642 that of zinc 7.142. According to these figures you do deposit more cadmium in weight than zinc but not in thickness.

The atomic weight of gold is 197.02 that of aluminum 27.01—a cubic inch of aluminum would therefore weigh only one-seventh or more of the weight of a cubic inch of gold, yet the measurement would be identical.

This is the reason why it is stated that under the same current densities twice the amount of cadmium will be deposited as compared with the weight of zinc, but not in thickness. It is the thickness of a plated metal deposit that determines its ultimate life under friction cadmium is comparatively soft, it lies between gold and tin—it is not as hard as silver. All soft metals have less re-

sistance to wear than harder metals, although they may be denser and weigh more in proportion to the thickness of harder metals, therefore, when cost as well as equal protection is considered zinc is the most economic factor. And zinc, when it is alloyed with mercury, is just as resistant as cadmium, and cadmium, alloyed with mercury, has a greater resistance to atmospheric oxidation and corrosion than pure cadmium. Our research laboratory has stated it has twice the resistance of cadmium combined with mercury.

I am not going to stand back of this statement, but if the atomic weight of mercury is 200.06 then an addition of 2 per cent mercury to either cadmium or zinc combined as an olloy, will produce denser metals with a higher atomic weight, and a resulting greater hardness, to resist the friction of wear than either of the metals uncombined with mercury.

We all have knowledge that the incorporation of definite percentages of other metals to steel increases its hardness and resistance to wear.

Nickel, chromium, vanadium and tungsten have all shown distinctive values when alloyed with steel in the non-ferrous metals —the same advantages accrue from the incorporation of phosphorous in the form of phosphor copper and tin—we might liken these alloying metal factors as colloidal metals. We know that when organic and metal colloids are added to certain plating solutions that the deposit becomes much harder and denser.

I have recently returned from the Middle West, and it is gratifying to relate that the demand for cadmium and zinc plated steel products are constantly on the increase and will continue to do so with the passing of each year, the automobile industry is one of the most important consumers of rust-free products made from steel plated both in cadmium and zinc.

Other lines of industry are constantly falling in line because such industries have commenced to realize the importance of giving to the consumer a more lasting, a more durable product for the price they pay, cadmium deposits are rapidly replacing nickel as a protective and finishing deposit, due to its silvery whiteness and the possibility of finishing the cadmium deposit to a high lustre by the aid of ball furnishing which results in an essentially harder deposit from the burnishing effect of the steel balls.

Cadmium is being used extensively in the art metal branch of the metal fabricating industry, in many instances it is replacing

silver for antique finishes in the production of rust-proof Flemish iron for reproduction in pewter effects.

Zinc mercury deposits upon steel is being used as a basis for the maximum results in black rust-proof finishes—all automobile rims finished in black rust-proof finish are first plated with zinc mercury deposit, then oxidized in a sodium hydroxide antimony solution, then finally coated with a black lacquer. Articles made from steel and plated in a standard duozinc solution and treated as mentioned have withstood the action of standard salt spray test for a maximum of 732 hours without breaking down with resulting rusting of the base steel. Therefore, such coatings are constantly increasing in demand where the maximum resistance is required upon steel, together with a resulting black finish. There are still hundreds of types of articles made from steel that still require to be protected from atmospheric corrosion by either cadmium or zinc and will eventually be so.

There is no mystery about cadmium plating. It is one of the easiest metals to deposit upon steel, cast or malleable iron. The solution has wonderful throwing power when properly prepared and requires the minimum attention for its control and upkeep. It has been found that a cadmium solution properly prepared and with cadmium mercury anodes requires only the addition of one-eighth to one-fourth ounce of sodium cyanide per gallon of solution per day for its upkeep, depending upon whether the cadmium solution operated is a still or mechanical one and the amount of work plated in a day in surface area.

All cadmium solutions should be electrically controlled, as well as chemically, whenever possible; it is absolutely necessary that you have electrical control—know what voltage and amperage and elapsed time is required to give a satisfactory resistant deposit that will satisfy your customer. It is wise to create a standard method of control of cadmium solutions so that standard deposit can be maintained; cadmium costs 85 cents per pound and zinc about 10 cents to 14 cents, depending upon the quality of the zinc and its proportionate alloy.

Wasting metal at 14 cents is not so great an economic waste as that of a metal costing 85 cents.

So advise your employers accordingly and prove to them that electrical controlling instruments, volt and ampere meters and a good black is a paying investment.

I am pleased to show you a number of samples of steel products plated both in cadmium and zinc with cad-a-loy anodes.

Whether you cadmium or zinc plate your product with commercial cadmium anodes or zinc anodes or cad-a-loy anodes or a patented process anode, the solution itself is or should be comparatively identical as to basic factors and component parts, I still hold it to be a determining factor in the control of any plating solution to know absolutely from what the solution is prepared, and the weight proportions in grams per litre or ounces per gallon, only with such knowledge in the possession of the plater is it possible for him to have the true knowledge of the solution control and constant operation upon an economic basis.

The samples shown you were plated in the following solution for 20 minutes.

The cadmium solution consists of the following materials and proportions by weight:

Water, 1 gallon; sodium cyanide, 9 ounces; cadmium oxide, 2 ounces; caustic potash, 1 ounce; brightener, black molasses, ¼ ounce.

In mechanical plating the sodium cyanide should be increased to 12 ounces and the cadimum oxide 3 ounces, the brightener to ⅛ ounce per gallon of water.

The voltage for a still solution may be as low as 4 volts and for a mechanical barrel solution 12 volts. Especially is this true when it is desired to produce a burnished lustre upon the cadmium plated steel articles without necessity of re-ball-burnishing for a lustre finish.

The samples shown were mechanically barrel plated at 20 revolutions per minute at a maximum pressure of 12 volts.

Amperage and time is always the important factors in standardizing thickness of deposit. Voltage is merely the pressure or push that overcomes internal resistance of the solution and enables greater amperages to be carried upon a given metal surface area anodes 98 per cent Cd 2 per cent. Hg.

Zinc solution:

Samples shown were plated in our standard improved zinc cyanide solution:

Water, 1 gallon; sodium cyanide, 4 ounces; zinc cyanide, 4 ounces; caustic soda, 4 ounces; cyanobrite, 1-15 ounce.

The operation of the zinc cyanide solution is practically identical

with the cadmium solution Anodes for both solutions are of the mercury alloy type, cadmium, 98 per cent, mercury 2 per cent; zinc 98 per cent, mercury 2 per cent. Both types of solutions require only the addition of sodium cyanides and the respective brighteners for upkeep and constant daily production.

The minimum sodium cyanide addition to either solution should be ⅛ ounce per gallon of solution per 9 or 10-hour day operation.

In mechanical conveyor units the sodium cyanide additions required will be ¼ ounce per gallon of solution during the same period, and in mechanical barrel plating ½ ounce per gallon of sodium cyanide may be necessary. With ample anode surface in both type of solutions the addition of metallic salts is very seldom required. Naturally, this will depend to a great extent upon drag-out upon the product because all materials that are soluble in the respective solutions is dragged out at one time. Only a complete analysis of the respective solutions can determine the exact loss per day or per week.

The mist and mystery surrounding plating solutions should be eliminated; must be eliminated in the future. The mystery surrounding cadmium plating was eliminated by publicity.

No firm should ever purchase a material to be added to a plating solution, neither should the plater add any combination of salts to his solution, irrespective of all the claims made for them unless he is reasonably sure of the names of the materials used in the compounds; he should then be able to judge what additions are right and which are wrong.

For cadmium oxide deposits:

Water, 1 gallon; hydrochloric acid, 5 ounces; platin-nig, ¼ ounce; temperature normal to 140° F.

A momentary immersion in this solution results in a black oxidized surface that can be relieved and lacquered under usual methods of proceedure. The platin-nig should be dissolved in the hydrochloric acid when heated to 160° F.; then add to the water.

For zinc oxide deposits:

Water, 1 gallon, caustic soda, 70 per cent, 4 ounces; white antimony oxide, ½ ounce; temperature, 120—140° F.

Use a small amount of warm water first to dissolve the caustic soda and antimony oxide; then add the balance of the water.

Zinc plated deposits upon steel treated with the antimony black oxidizing solution and finally lacquered with a black lacquer of the

nublac type will stand up under the salt spray test for over 700 hours. The maximum resistance for steel finished in a black finish is improved zinc deposite antimony oxide black and nublac black lacquer.

A 10-minute deposit of zinc will give a rust resistance under the salt spray test for 48 hours. Put on an antimony oxide black and it jumps to more than 200 hours. Put a final coat of nublack lacquer upon the surface and the resistance jumps to 725 hours. This is the type of finish that the writer developed for rustproof black automobile rims now being used so extensively at present.

When a black finish is required with absolute maximum resistance that can be produced in a minimum of time, then the finishes as outlined will give you the finish you want.

It is my earnest hope that from this paper you will have a more complete knowledge of cadmium and zinc plating under any condition and that from the information conveyed to you a better and more economical production of products will result.

If from their application this is accomplished, then I shall feel fully repaid for what I have tried to convey to you in this paper presented to you this evening.

Question:

Can you get a bright finish on the zinc plating?

Answer:

Oh, yes, that is zinc plating which you have there, if you scratch the one which is cadmium plated, you will find how much softer it is. Then scratch the zinc one you will find it much harder, it is a little more difficult, therefore, to get a lustre on zinc than upon cadmium.

Question:

All these pieces that you have shown us have been cyanide zinc plated, haven't they?

Answer:

Yes, all with cyanide solution.

Question:

We coat steel handles, and hang about 1000 or 1200 on a frame, and after they lay around a certain time in stock, the stock will oxidize, get black spots on it.

Answer:

What size are the black spots; how large are they?

Question:

Just like little pin points all over—like a tarnish, I might say.

Answer:

That is the old spitting out that we have to contend with; of course, I don't know just exactly how you would overcome that, except that washing and drying thoroughly and using heat is about the only way. You probably get some little hydrogen in the cadmium that produces a very minute pin spot and, naturally, if you have a little hydrogen around there, you get spotting, and it means more thorough washing, or using some factor that won't act upon the cadmium, such as, for instance, a very dilute solution of phosphoric acid, ⅛ ounce to a gallon of water which would neutralize the cyanide in the cadmium, but it is one of those spitting out problems that we are trying to lick, but we haven't got it licked as yet.

Question:

In obtaining the oxidized finish over cadmium, in this particular finish, this is not over a wheel, but just in the oxidizing?

Answer:

Yes, the method of producing that finish we cadmium plate for a period, then scratch brush down, and then afterward take the platnique solution (5 oz. hydrochloric acid, a gallon of water and ¼ oz. of platnique), and put it on the steam table and take a piece of rubber sponge, then a piece of cloth and just saturate that cloth with the solution and put the imprint on here and let it dry, and then we lacquer that surface.

Question:

That red effect on that shell, is that a lacquer finish?

Answer:

As you can readily see, that has been cadmium plated all over, and then after it was cadmium plated and spotted, as I explained with a sponge, then we just take a section of this shell and it sets over that and we just cut that down and color it on a wheel and then rub burnt umber in there and, of course, that covers up the cadmium in the background and gives you the antique effect.

Question:

I would like to ask Mr. Proctor whether you would have the same trouble with cadmium plating in spotting out like you would with the cyanide copper on something that was porous. You don't have that to contend with in the cyanide zinc solution. We have very little trouble with spotting, but in cyanide copper, we do, and

let it lay for a few days before we finish it up, but on cadmium plating would you have to do the same thing?

Answer:

Of course, naturally, when you use cyanide solution, and have any porosity in your basic metal, it is always well to be very thorough in your washing operations, but you know when we get spotting out from cyanide solution, we usually get black spots, but usually more of a whitish spot from cadmium, because cadmium sulphites are a little bit more yellowish, but if you are very careful in washing and drying, there should be no spotting out that would be objectionable in cadmium plating.

Chairman:

Now, while we are on this subject of cadmium, we had a question asked in our "Reminder" last month, in reference to "What deposit of cadmium would be required on steel under nickel plating, to stand a salt spray test of 14 hours," and a Newark Branch member wrote us that a ten-minute deposit of cadmium of 30 amps. per square foot would resist a salt spray test for 160 hours. Now, personally, I think he made a mistake, because he doesn't say under nickel. Will Mr. Proctor please give us his answer to the above question?

Mr. Proctor:

The minimum thickness of cadmium that should be applied to the steel surface would not be less that 1-10.000ths. That would stand up approximately about 50 hours under the salt spray test, but when you deposit nickel upon the surface of the cadmium, the value of the cadmium is reduced from 40 per cent to 60 per cent; but, even at that, you should be able to produce a coating of cadmium that would stand up readily 48 hours under the salt spray test.

DETROIT BRANCH

The meeting night of Detroit Branch A. E. S. has been changed to the first Friday of each month.

The first regular monthly meeting of Detroit Branch A. E. S. was held at the Statler Hotel on Friday, September 7, 1928, President E. V. Allen presiding. This being an alternate month, the meeting was turned over to the Educational Committee. Mr. H. J. Jameson, chairman of the committee, introduced the speaker of the evening, Mr. Schneidewind, who gave a very educational illustrated lecture on chromium plating and its peculiarities and answered all questions asked him to the satisfaction of all. A Convention Committee was also appointed by the Chair to get things whipped into shape for the 1929

convention and which Detroit will try and make the banner event in the history of the society. Respectfully yours,

Chas. M. Phillips, Secretary-Treasurer,
13421 Camden Avenue.

CHICAGO BRANCH

Regular monthly meeting Chicago Branch held September 8th at Atlantic Hotel.

Meeting called to order, President Meyers presiding.

The attendance was fair, but nevertheless the meeting was very interesting.

We are very glad to hear that Mr. H. E. Willmore is again on the road to recovery, having undergone a very serious operation. We all hope to see him at the next meeting.

There were three applications received, after being referred to Investigating Committee, the Librarian conducted the balance of the meeting.

The following questions were found in the Question Box:

Question 1. Give formula for a nickel solution for plating over zinc.

Answer 1. Double nickel salts, 5 oz.; ammonium sulphate, 8 oz.; sodium chloride, 1 oz.; citric acid, ¼ oz.; or double nickel salts, 8 oz.; single nickel salts, 4 oz.; magnesium sulphate, 4 oz.; boric acid, 2 oz.; sodium chloride, 2 oz.

Question 2. Is mercury a good brightener for a cyanide zinc solution?

Answer 2. Yes, if used in right proportions.

Question 3. What is a good brightener for a cadmium solution and the proper amount to use; also what is the proper free cyanide contents?

Answer 3. It was suggested that a commercial brightener can be obtained that is very good; also glue added in small proportions is very good; as to the cyanide, it was thought 7 to 8 oz. best.

Question 4. Is it any harder to plate a rough brass casting than if polished and buffed?

Answer 4. Yes.

Question 5. Is chromium being deposited in a chloride solution? If so, what is the formula?

Answer 5. No formula given.

Question 6. Does chromium ever plate soft enough to file?

Answer 6. Yes.

Question 7. If so, what will keep it file hard?

Answer 7. Depends upon the temperature and current used.

Question 8. Would it be necessary to harden the wearing surface before chromium plating?

Answer 8. Depends upon the articles and their uses.

Question 9. Must the work be nickeled first?

Answer 9. No.

Question 10. Has any one tried an 18-20 per cent chrome steel anodes in chromium solution; if so, what were the results?

Answer 10. It was thought that the results would not be any better.

Question 11. How can chromium sulphate be dissolved?

Answer 11. In hot water. It was suggested to purchase the best of sulphate.

Question 12. Can sodium perborate be added to a nickel solution without adding muriatic acid if the solution is a little too acid?

Answer 12. Yes, it can be added.

There being no other business, meeting adjourned at 10 p. m.

S. J. C. Trapp, Secretary.

BALTIMORE-WASHINGTON BRANCH

A meeting was held by the above Branch September 8 at the Enoch Pratt Library, Calhoun and Hollins St., Baltimore. President F. F. Pierdon presided.

It was decided to hold future meetings as follows: Saturday following first Monday each month in Baltimore and third Saturday each month in Washington.

The meetings in Washington Bureau of Standards are entirely for the purpose of experimental work, etc., regarding to plating.

It was decided to take "Nickel Solutions" as our first study.

We had Mr. Reama as speaker for the evening. His subject being "Cleaners," and he sure made a clean job of it. Speaking in favor of a two tank system, also different action cleaners had on different kind of metals, also the attention required to cleaning baths, towards the success of a plater. A standing vote of thanks was given Mr. Reama at the close of his very interesting lecture.

Mr. Chace will be next speaker October 6 at Enoch Pratt Library, Baltimore. His subject will be "Lacquer."

Five applications were received and duly elected as members.

Twenty-two attended meeting. Geo. F. Turner, Secretary.

ROCHESTER BRANCH

At the regular meeting of Rochester Branch, held at Power's Hotel August 17, it was decided to hold a family outing and clam bake on Saturday, September 22, at Rifle Range, Rochester. The following committee were appointed by President Reama to have charge of the entertainment and sports: Mr. Gartland, Mr. Lopez, Mr. Wolff, Mr. Hehr and Mr. Hart.

On Friday evening, September 21, Rochester Branch will hold their regular monthly meeting at that time. Rochester and Western New York members will be given a chance to hear MR. OSCAR J. SIZELORE speak on "Chromium Plating." Our President, MR. HORACE SMITH, will also VISIT ROCHESTER BRANCH at this time.

Chas. Griffin, Secretary.

CLEVELAND BRANCH

We held our monthly meeting August 4, but as the evening was so awfully warm the attendance was very poor. we elected one active member, Mr. A. J. Penman, 3315 W. 105th St., Cleveland, O. He is with the Chromium Corporation of America and a former member of our Branch.

We were to discuss "Plating on Aluminum," but owing to the poor attendance we are going to take up the same subject next time. Our question box had the following:

What makes the P. H. of a nickel solution go up in one tank and not in the other?

Answer. The anode efficiency is greater than the cathode, and the remedy suggested was, less chlorides in solution, or greater anode current density or less anodes. After which we adjourned.

Cleveland Branch had their annual picnic at Puritas Springs Park July 29, and everyone had a good time. Some members that had not been to a meeting for so long that yours truly did not recognize them, were there, and we were glad to see them, at least we know they are getting their mail. Well, I am getting away from the fun at the picnic. The most important event was of course the ball game. After playing five innings everyone was so tired they could not be induced to play any longer although the score was only 27 to 27, and as it was a tie, they established something new in a ball game. Just leave it to our bunch. Well, we had a game of archery and a sort of blind man's buff game that produced more fun than all the other games put together, and the members that were not there missed a big time.

H. J. TerDoest, Secretary.

NEWARK BRANCH

Newark Branch A. E. S. held its regular meeting on Friday, August 17, 1928, President Geo. Wagner presiding and the Secretary-Treasurer back at his desk after an illness with rheumatism. Twenty-three members were present with one visitor. Minutes of the previous meeting were approved as read. Bill for $6.00 for printing of return postals ordered paid. Mr. T. A. Gardner was accepted as a transferred member from New York Branch. Mr. Smith reported on the fishing trip. Under new business, Mr. Smith asked for the status of Mr. John Merigold of California and Mr. Clarence O. Field of Rochester, as both former members are desirous of again joining the A. E. S.

Mr. I. R. Taylor, our librarian, gave a fine talk on the "Storage Battery and Dynamo"—being the source of electricity for electroplating. Discussion on 14 karat gold plating for wear, antique green gold solutions with arsenate of lead as the medium in securing the black smut and bronze solutions, took place until 10 p. m., when adjournment was called for.

Receipts—Dues, $36.00; banquet, $3.00; total $39.00. Expenses—$6.00.

Royal F. Clark, Secretary-Treasurer.

APPLICATIONS

	Branch
Chas. F. Gross, Norristown, Pa	Philadelphia
Jacob Majerski, Chicago, Ill	Chicago
Erich O. W. Presser, Chicago, Ill	Chicago
F. J. Remker, Chicago, Ill	Chicago
D. Kelley, 88 Central Ave., Roosevelt, Long Island	New York
Chas. Berlin, 106-8 Fulton St., New York City	New York

ELECTIONS

	Branch
Horace Haring, Camden, N. J	Philadelphia
W. Raymond Good, Boyersford, Pa	Philadelphia
M. G. Herback, Philadelphia, Pa	Philadelphia
A. D. Weil, London, England	Philadelphia
Fred Rickershauser, 30 43rd St., Irvington, N. J	Newark
George A. Miller, 306 Geyer Ave., St. Louis, Mo	St. Louis
George W. Gibson, 411 E. 18th St., Kansas City, Mo	St. Louis
John W. English, 8 Colony St., Ausonia, Conn	Bridgeport
Alfred J. Penmann, 3315 W. 105th St., Cleveland, O	Cleveland
Daniel Davies, 847 Devon St., Kearney, N. J	Newark
Paul A. Oldam, 143 Schuyler Ave., Kearney, N. J	Newark
Wm. C. Neadwell, 9 Riggs Place, West Orange, N. J	Newark
R. F. Weaver, 718 Highland Ave., Newark, N. J	Newark

REINSTATEMENTS

Louis Sherman, 2545 N. 32nd St., Philadelphia, Pa	Philadelphia

SUSPENSIONS

	Branch
C. D. Easley, 707 Bailey St., Camden, N. J	Philadelphia
E. Gann	Newark
J. Moriarity	Newark

TRANSFERS

	Branch
G. F. P. Turner, from Philadelphia to	Baltimore-Washington
G. I. Parater, from Philadelphia to	Baltimore-Washington
H. H. Rema, from Philadelphia to	Baltimore-Washington
John M. Grubler, from Philadelphia to	Baltimore-Washington
I. A. Gardner, from New York to	Newark

CHANGE OF ADDRESS

	Branch
B. Holgram to 31 Gray St., Jersey City, N. J	Newark
H. Hults to 23 South Mountain Rd., Milburn, N. J	Newark
W. Harrison to 401 North 6th St., Newark, N. J	Newark
George Goram to 1718 Woodbine St	New York
N. Marketon to 273 East 175th St	New York

BOSTON

Platers' Supply Co., 202 Friend St., Boston. Secretary, A. W. Garrett, 41 King St., Dorchester, Mass.

BRIDGEPORT

Meets first and third Friday of each month at 62 Cannon St., Room 17, Bridgeport, Conn. Secretary, Wm. Ehrencrona, 872 Hancock Ave., Bridgeport, Conn.

CHICAGO

Meets second Saturday of each month, at 8 p. m., Atlantic Hotel, 816 S. Clark St. Secretary, S. J. C. Trapp, 1127 N. 7th St., Maywood, Ill.

CINCINNATI

Meets every Thursday, 7:30 p. m., at Vocational Training School, Spring and Liberty St. Secretary, Al. Yeager, 2021 Sherman Ave., Norwood, Ohio.

CLEVELAND

Meets first Saturday of each month at Hotel Winton. H. Terdoest, 414 Pioneer Ave., Akron, Ohio.

HARTFORD-CONN. VALLEY

Meets fourth Monday in each month alternately at 266 Pearl St., Hartford, Conn., and corner Broadway and Worthington St., Springfield. Secretary, Grant Vernon, 43 Putnam St., Bristol, Conn.

DAYTON

Meets first Saturday of each month at the Y. M. C. A., Dayton, Ohio. Secretary, Robert G. Suman, 2734 Ridge Road, Dayton, Ohio.

DETROIT

Meets the second Wednesday of each month at the Detroit Testing Laboratory, 554 Bagley Ave., Detroit. Secretary, Chas. Phillips, 13421 Camden Ave., Detroit, Mich.

GRAND RAPIDS

Meets on the second Saturday of each month at the Vocational High School, 129 Bostwick Ave., N. E. Secretary, Jacob Van Dyke, 1361 Union Ave., N. E., Grand Rapids, Mich.

INDIANAPOLIS

Meets the second Saturday of each month at Hotel Denison. Secretary, Louis Mertz, 1725 Union St., Indianapolis, Ind.

MILWAUKEE

Meets second and fourth Thursdays of each month at Cor. 3rd St. and Highland Ave. J. N. Hock, 1229 W. 24th St., Milwaukee, Wis.

MONTREAL

Meets last Friday of month at Office of Secretary, John H. Feelay, 411 Aylmer St., Quebec, Canada.

NEWARK

Meets first and third Fridays of each month at Franklin Hall, 41 Franklin St., Newark, N. J., at 8 p. m. Secretary-Treasurer, Royal F. Clark, P. O. Box 201, Newark, N. J.

NEW YORK

Meets every second and fourth Fridays of each month in the World Building, Park Row, New York City, N. Y. Secretary, R. J. Liquori, 2439 Hubbard St., Brooklyn, N. Y.

PHILADELPHIA

Meets first Friday of each month in the Harrison Laboratory Building, University of Pennsylvania, 34th and Spruce Sts. Secretary, P. Uhl, 2432 North 29th St., Philadelphia, Pa.

PITTSBURGH

Meets first Friday of each month at 8 p. m., at downtown branch, Y. M. C. A. Secretary, S. E. Hedden, 227 Fifth St., Aspinwall, Pa.

PROVIDENCE-ATTLEBORO

Meets first and third Thursday of each month at 44 Washington St., Prov. Engineers Rooms, Providence, R. I. Secretary, J. H. Andrews, 19 Rosedale St., Providence, R. I.

ROCHESTER

Meets every third Friday of each month at the Powers Hotel. Secretary Chas. Griffin, 24 Garson Ave., Rochester, N. Y.

ST. LOUIS

Meets first Friday of each month at Barr Branch Library, corner Jefferso and Lafayette Sts. Secretary, C. T. McGinley, 5312 West Florisant Ave., St Louis, Mo.

TOLEDO

Meets first Thursday of each month at Toledo Secor Hotel, corner Cherry an Page Sts. Secretary, W. W. Weiker, 2228 Middlesex Rd., Route 2, Box 635, Toledo, Ohio.

TORONTO

Meets fourth Monday of each month at Canadian Foresters' Hall, 22 College St., Room No. 2. Secretary, W. J. Sutherland, 197 Gillard Ave., Toronto, 6, Canada.

WATERBURY

Meets every second and fourth Thursday of each month. Secretary, Wm. F. Guilfoile, Garden Theatre Bldg., East Main St., Waterbury, Conn.